

# Preparing a soluble salt

## Equipment (per group)

- Access to a kettle to supply hot water
- 1 x bunsen burner, tripod, gauze, mat
- 1 x balance (1 or 2 decimal place display)
- 1 x 250 cm<sup>3</sup> beaker
- 1 x boiling tube
- 1 x 25 cm<sup>3</sup> measuring cylinder
- 1 x spatula
- 1 x stirring rod
- 1 x dropping pipette
- 1 x weighing boat
- 1 x 100cm<sup>3</sup> conical flask
- 1 x filter funnel and filter paper
- Anti-bumping granules
- Wooden splints
- Evaporating basin or old petri dish (preferably scratched)

Safety equipment: safety spectacles

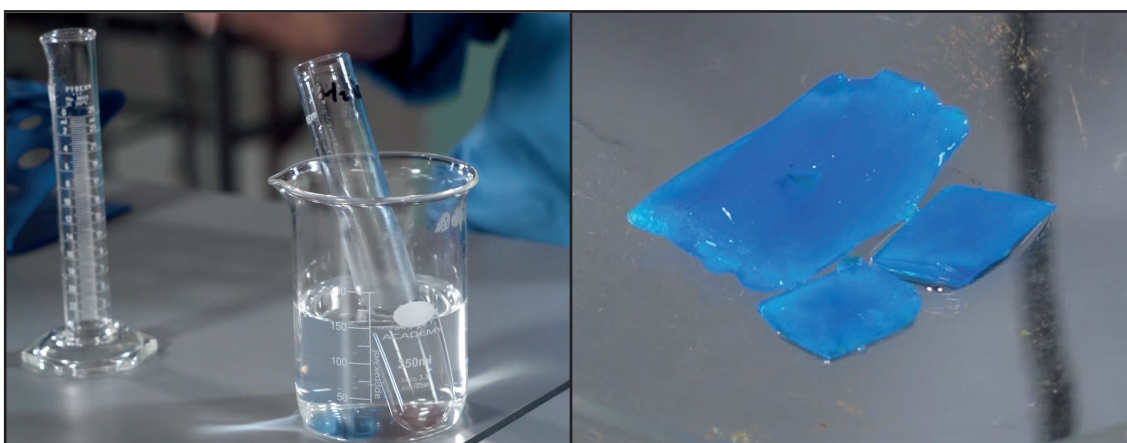
## Preparation

- Copper(II) oxide powder – between 1.8 and 2.0 g
- 15 cm<sup>3</sup> sulfuric(VI) acid

## Equipment set-up and tips



You can reduce the equipment needed by pre-measuring the sulfuric acid and the copper(II) oxide. Always follow the risk assessment for a particular class and for the room to position the Bunsen burners.






Sulfuric acid is warmed in a beaker of boiled water for 2 to 3 minutes.

A slow cooling rate will produce larger crystals.

## Safety

Read our [standard health & safety guidance](#) and carry out a risk assessment before running any live practical.

Hazard classification may vary depending on supplier.

Chemical supplied for the practical	Preparation
Copper(II) oxide powder $\text{CuO (s)}$  <b>WARNING</b> <b>DANGER</b> Harmful if swallowed Causes skin irritation Harmful if inhaled Very toxic to aquatic life with long-lasting effects Causes serious eye irritation	Dilute using sulfuric(VI) acid $2.0 \text{ mol dm}^{-3}$ $\text{H}_2\text{SO}_4 \text{ (aq)}$  <b>DANGER</b> Corrosive – skin and eyes (Measure $70\text{cm}^3$ of sulfuric(VI) acid $2.0 \text{ mol dm}^{-3}$ and make up to $100\text{cm}^3$ with distilled/ deionised water. Scale-up as required) Or prepare from concentrated acid sulfuric(VI) acid concentrated $\text{H}_2\text{SO}_4 \text{ (l)}$ $\text{MW} = 98.07 \text{ g mol}^{-1}$  <b>DANGER</b> Causes severe skin burns and eye damage

- The sulphuric acid can be pre measured in a boiling tube, which can be covered with Parafilm.
- Pre-weigh the copper(II) oxide powder in a bijou bottles or in a weighing boat, if possible.
- This experiment is based on the CLEAPSS method and the specific concentration of sulfuric acid should produce an almost saturated solution of copper(II) sulfate hence minimal heating is needed to evaporate excess water.
- Crystals should start forming very quickly when the solution cools down.
- Old and scratched petri dishes are better as they provide a rough surface for the crystals to grow.

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**Chemical produced**

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Copper(II) sulfate(vi)-5-water solid

$\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$  (s)

MW = 249.68 g mol<sup>-1</sup>

**DANGER**

Harmful if swallowed

Causes skin irritation

Causes serious eye damage

Very toxic to aquatic life with long lasting effects

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Do not leave the copper(II) sulfate solution to evaporate in the laboratory and do not let the students take the crystals home.

**Disposal**

The excess of copper(II) oxide on the filter paper should be minimal and can be placed in normal waste.

Keep the copper(II) sulfate crystals to make solutions that do not need to be of an accurate concentration, or use as seedlings to grow crystals from saturated solutions.